

Inventions represented at Danish IP Fair 2018

MedTech and Diagnostics

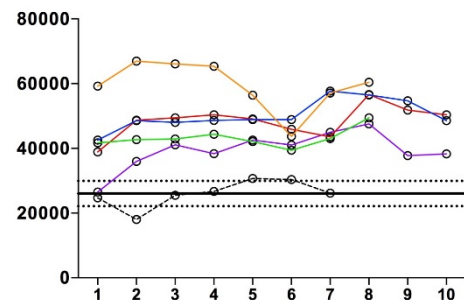
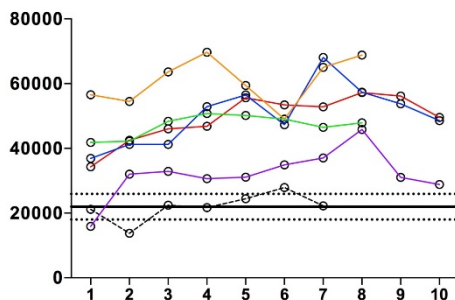
This document contains one-pagers for all inventions within **MedTech and Diagnostics** presented at the Danish IP Fair 2018. You can use this document to identify meeting partners at the event. Each invention is marked with a unique ID at the top right of the page. Use this ID to look up and book a meeting with the inventor(s) at the Danish IP Fair website - www.dipfair.dk.

The document will be updated regularly in the period February-April, so ensure to re-visit the website for the newest version.

For further guidelines regarding meeting bookings please consult the menu Matchmaking on the website.

New Biomarker Class for Multiple Sclerosis

Precision Medicine in Brain Disease



Value Proposition

State-of-the-art diagnosis and monitoring in MS are expensive, invasive, and monitor late-stage damage from disease activity. With the **discovery** of a **new class of sugar-based, blood-borne biomarkers** for **multiple sclerosis (MS)**, **early** events in autoimmune disease become traceable by the presence of specific shedding patterns in biological fluids.

Prevalence of **autoimmunity is rising**, and with it a burgeoning market **value**. **Investment** in this technology will position the investor on the front-line of complementary diagnostics for streamlining drug development, identifying treatment responders, and improving patient care through **precision medicine**.

Business Opportunity

With an estimated market size of **25 billion USD** for therapeutics and **16 billion USD** for diagnostic tools alone, this technology could exploit both of these market values through **efficient drug development** internally and a **sellable product** for clinics.

We are currently seeking collaborators to include our technology in their drug development and clinical trials and with biobanks interested in MS. Secondly, we seek partnership for development of a sellable kit for delivery of our technology broadly. We have established collaborations presently that will see some goals achieved in the following two quarters. We envision expansion of this collaboration base. We are currently seeking partners for kit development. We expect this to be a 1-year process upon partnership due to our extension knowledge of the markers involved.

Technology Summary

We have proof-of-concept tested a class of non-protein, sugar-based soluble markers that are released into the **bloodstream** upon immune invasion into the brain. These signals can be easily tested at a **high-resolution** ensuring a **low-cost** determination of disease status. We envision these measurements to have proven value in **distinguishing patient subtypes** and **treatment responders**.

Development Phase

The current phase of the invention is expanding upon established patient proof-of-concept into MS subtyping and treatment response.

The inventors

Brian Della Valle, Ph. D. (60%)
Casper Hempel, Ph.D. (30%)
Agnete Larsen, MD, Ph.D. (10%)

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Seeking

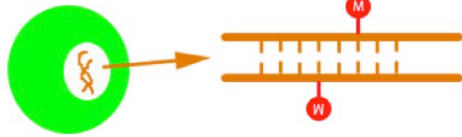
- Licensee
- Partner/Research Collaboration

European Priority application filed December 2017. Co-owned by Aarhus University (70%) and DTU (30%).

Transforming epigenetic research and diagnostics

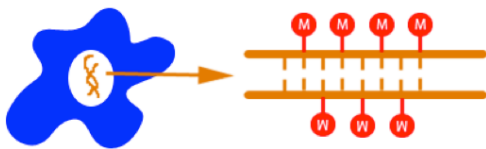
- cutting edge DNA methylation detection technology for cancer research and diagnostics

normal cell:

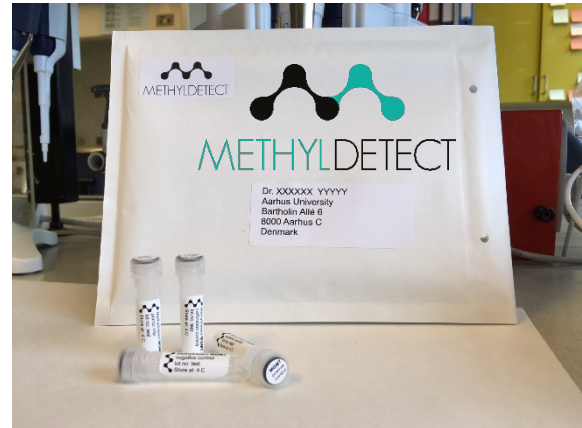


Gain of methylation that causes disease

cancer cell:



Detection of DNA methylation changes
MethylDetect ApS kit



Value Proposition/USP

MethylDetect offers ready-to-use kits for detection of aberrant gene methylation. The kits are based on the MS-HRM technology and can be used with standard laboratory equipment. Additionally, our new controls system, shipped with each kit, provides state-of-the-art experimental reliability.

Business Opportunity/Objective/Commercial Perspectives

Two main strategic opportunities:

1. Research Use Only (RUO), where our kits serve as research tools, will enable us to get quick access to the market and generation of a positive cash flow.
2. Diagnostic Use (Dx), where our technology, through clinical research and validation of disease specific tests, will allow development of *in vitro* diagnostic (IVD) kits providing a very strong income source for the company.

Technology Description/Technology Summary

Advantages of the MethylDetect's technology:

- ready-to-use kits on standard laboratory instruments
- cost-effective
- fast and robust in combination with new experimental control system
- user friendly

Development Phase/Current State

Along with marketing of our first-generation research-use-only product we are working toward future in-vitro diagnostic applications of our technology.

We are looking to partners to develop our in vitro diagnostic product line.

The inventors

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CEO, Co-funder

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Board Member, Co-funder

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Seeking

- Funding/Investors
- Partner/Research Collaboration

MethylDetect ApS technology is protected under patent granted: US20090155791A1

Home Kemo Care

How to reduce home and environmental impact of cytotoxic drugs after treatment.



Value Proposition/USP

Most cancer treatment with medical chemotherapy is done in an ambulatory setting. Patients receive the treatment in hospital and then go home shortly after. This means that drug residues are excreted (urine and feces) in the patients home and directly into the sewage system. Cytotoxic drugs are generally highly toxic (carcinogenic and mutagenic). Great care is taken in the healthcare system to protect staff against exposure, but patients are advised to live normally without taking precautionary steps. It is known for research that contamination with cytotoxic drugs do take place in patients homes and that is a risk to relatives and careers that is not addressed today. This invention provides a flexible, user friendly and cost effective solution to this challenge.

Business Opportunity/Objective/Commercial Perspectives

This invention can be used world wide in a growing market. In Denmark alone about 320.000 units of medical chemotherapy is used yearly. The average patients receives ca. 2 types of medication per treatment. This kits is to be used only for about 3 day after each treatment. Estimated 6 toilet visits/24 hours/patient means the potential is $18 \times 160,000 = c.2,900,000$ kits/yr. Cancer cases are increasing – c.35-44 new cancer cases pr. 10.000 inhabitants annually. Treatment with medical chemotherapy is expensive - main reason for the escalating expenditure on drugs. In 2016 Region H used ca. 673 mill. kr. (90 mill €) on medical chemotherapy.

Technology Description/Technology Summary

Kit for collecting urine and feces from the patient after chemotherapy treatment

The bag is fitted to the toilet, so the toilet seat is covered by the bag (Important to protect other users/family of the toilet against carcinogenic drug residues).

Development Phase/Current State

A patent application on Home Kemo Care has been filled and prototypes has been developed.

A major hospital in The capital Region are willing to take part in a test of Home Kemo Care with patients.

The inventors

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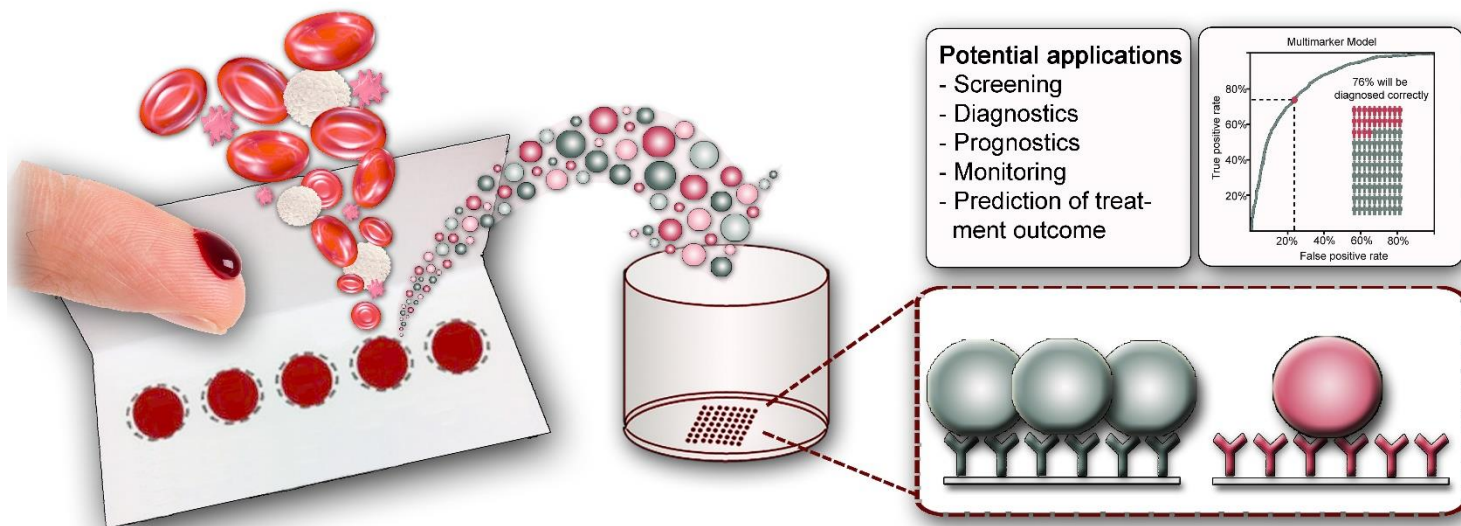
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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Patent application filed April 20, 2017 - EP17167263

Blood Card and Vesicle-based Medical Tests



Value Proposition/USP

The method is based on a combination of the dry blood sample (DBS) on a blood card and extracellular vesicle (EV) array. DBS is a minimally invasive and widespread method for collecting blood samples, where samples are transported, stored and processed easily. Combined with the EV Array's ability to detect extracellular vesicles from unpurified blood makes this combination promising with regard to find biomarkers for cancer, inflammatory, metabolic, cardiovascular or neurodegenerative diseases. Another application is diagnosing, screening and monitoring of drug resistance, making drug trials cheaper, as less blood is needed.

Business Opportunity/Objective/Commercial Perspectives

DBS combined with the EV Array, utilizes a proven, cost-effective tool with a strong diagnostic tool making handling and processing of blood samples promising in developed and developing countries alike. The DBS-EV Array combination would reduce the cost of acquiring blood samples, and opens the possibility for development of home test kits.

Technology Description/Technology Summary

The proposed method is a combination of a known method for collecting blood samples used for more than 50 years, where samples are easily transported and stored as significantly less blood is required, with the EV Array, a new method for characterization of extracellular vesicles directly from plasma without purification requiring only 10 μ L of sample. The EV Array is a protein-based microarray enabling classification of multiple surface markers simultaneously.

Development Phase/Current State

A test setup with 20 subjects has proven that it is possible to measure vesicles from DBS, as a proof of concept. Several parameters can be optimized such as time, temperature, buffer and quantities. A series of optimization experiments must be performed with more donors before commercialization; this is estimated to take 2-3 months without extensive costs.

The inventors

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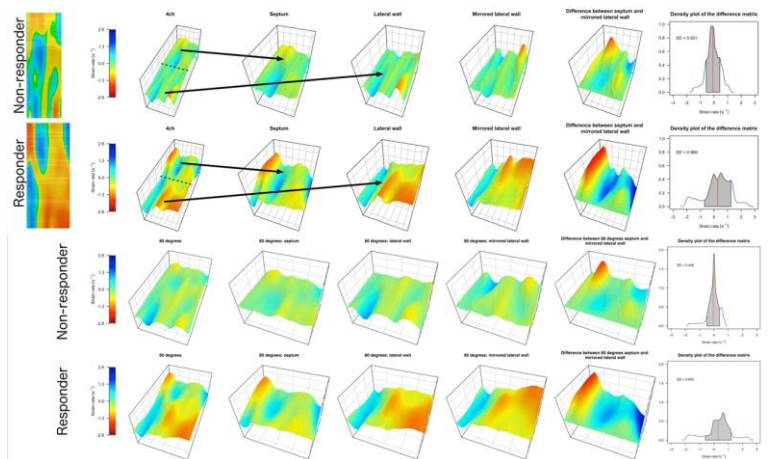
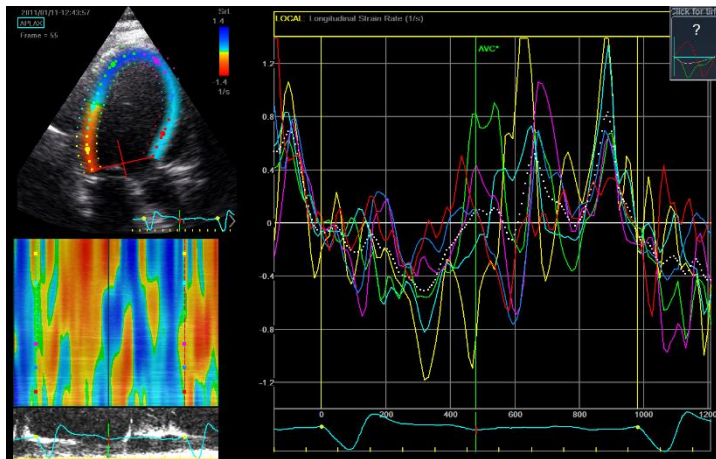
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Seeking

- Funding
- Partner/Research Collaboration
- IPR Sale/Licensing

Intellectual property rights: Patent pending EP17206867.8, filed on Dec.13th, 2017

Method for detection and assessment of heart dyssynchrony- based on 2D echocardiography



Value Proposition

Heart failure affects yearly on average 5-10% of the elderly population. Most severe cases are caused by left bundle branch block and are corrected by cardiac resynchronisation therapy (CRT). Every year, a thousand patients receive a CRT-implant in Denmark, while about 1/3 of the treatments are without benefit to the patient. So far, methods based on deformation of the heart have proven not robust enough for predicting the benefits of CRT's. Also, current 3D techniques are limited by significantly lower time-resolution. Interpolated 3D images aim to solve this problem.

Business Opportunity/Objective/Commercial Perspectives

The potential commercial perspective is a more precise method for clinicians to evaluate cardiac failure mechanisms, dyssynchrony, and to assess the results of CRT. Calculation of used parameters are fast (< 1min on standard PC) and can be performed on 2D images recorded with hardware already present in the clinic.

Technology Description/Technology Summary

The proposed method creates 3D heart deformation data from 2D scanning, using interpolated data from cardiac movement. This enables a quantitative and qualitative assessment of the heart's deformation, with a higher time-resolution. The estimation of the heart's dyssynchrony is made from a significantly larger area of the heart, giving a better representation of the dyssynchronous contraction. The visual representation provides timing and contraction information in a dynamic 3D-perspective, allowing for better assessment of patients who will benefit from CRT. The visualisation of the left ventricle is expected to aid in the optimal electrode placement of the CRT-unit during operation, as well as aid in the patient selection for CRT.

Development Phase/Current State

Preliminary results from 101 CRT patients show a sensitivity of 61% and a specificity on 82% The ability to predict an improvement in the left ventricle is 90%, the ability to predict no improvement is 43%, and accuracy is 66%.

The inventor

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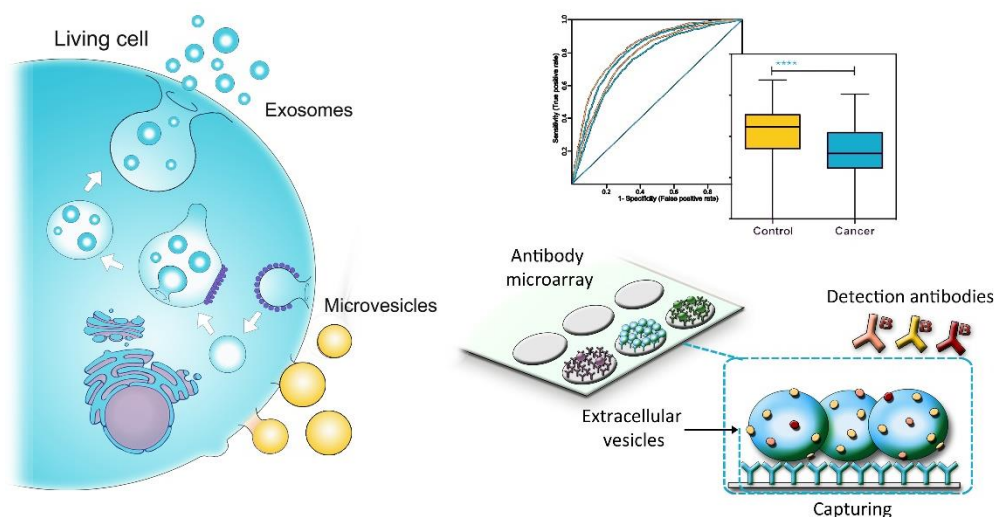
Seeking

- Funding
- Research Collaboration
- IPR Licensing or sale

Intellectual property rights: Patent pending CA2994617, AU2018200974, February, 9th 2018

EV ARRAY

High-throughput Multiplexed Phenotyping of Extracellular Vesicles (EVs)



Value Proposition/USP

EV Array is an **unique biomarker platform** that can exploit the intercellular trafficking in various biofluids to provide a non-invasive method for diagnostics and prognostics.

Business Opportunity/Objective/Commercial Perspectives

The apparent role of EVs in a vast number of biological processes, forms the basis of extending EV analysis beyond basic research and into clinical and therapeutic context. The applications of this type of analysis include the areas of diagnostics and prognostics, as well as drug therapy, regenerative medicine, and vaccines. The analysis of EVs could be incorporated as a screening tool and applied to confirm a diagnosis. Furthermore, the EV Array analysis has the potential to become an element in treatment surveillance and companion diagnostics.

Technology Description/Technology Summary

The EV Array is based on the technology of protein microarray and allows for the detection and phenotyping of EVs from unpurified starting material in a high-throughput manner. The technology was developed to perform multiplexed phenotyping of EVs in an open platform. The EV Array has been optimized for plasma, but can analyze urine, saliva, ascites, bone marrow, and cerebrospinal-, synovial- and bronchoalveolar fluids as well.

Development Phase/Current State

The current stage of the EV Array technology is a **fully developed analysis** optimized for a small-to-medium laboratory research scale. Several studies has demonstrated the EV Array efficiency in detecting cancers, lung-related diseases (pneumonia, COPD), venous thrombosis, multiple sclerosis and malaria.

The inventors

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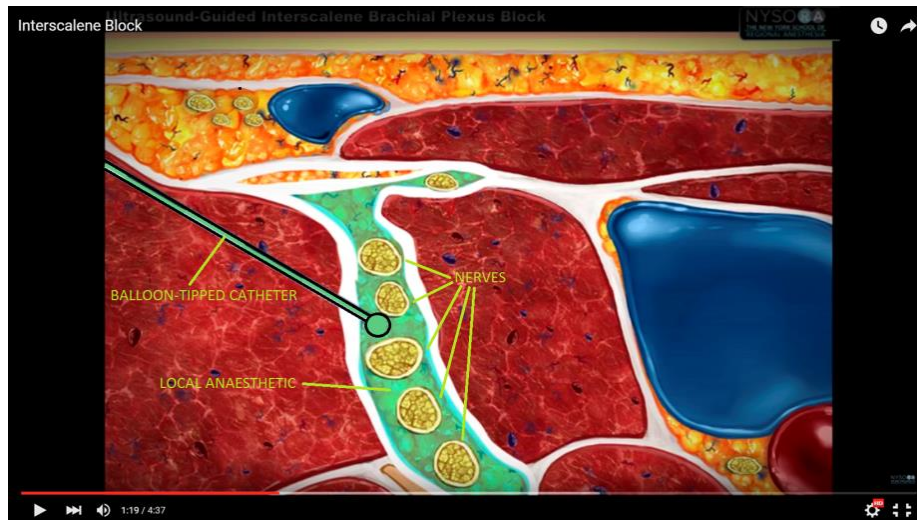
Seeking

- Funding
- Research Collaboration
- Sale of services

Intellectual property rights: None

A novel balloon-tipped catheter for continuous nerve block

- guaranteed painfree after surgery



Value Proposition/USP

Imagine leaving the hospital with no pain! In a time where health expenses rise and hospitals all over the world are challenged financially providing safe and reliable pain relief after surgery new interventions are needed. Conventional pain therapies with opioids have several adverse effects. Preliminary studies with cPNBs, where the patient is sent home with a nerve-block catheter continuously delivering local anesthetic show the drawback that the catheter tip easily gets displaced with huge pain for the patient. The current invention is a balloon-tipped cPNB that fixates the tip of the catheter in close proximity of the nerve, securing patient safety and a pain free experience with re-hospitalization.

Business Opportunity/Objective/Commercial Perspectives

The market is enormous worldwide:

- The number of orthopedic surgeries is estimated to reach 6.6 M/year in the US 2020. And the market is not only in the US nor limited to orthopedic surgery.
- Besides arthroplastic surgery cPNBs can be used for pain relief in patients undergoing surgery for fractures, removal of tumors, arthroscopic surgery, plastic surgery, burns etc.

Technology Description/Technology Summary

The invention consists of a catheter for continuous nerve block. The catheter has an inflatable balloon at the tip. The catheter has two internal lumens, one for inflating of the balloon and the other for delivering the local anesthetic to block the nerve. The balloon serves to keep the tip of the catheter in close proximity to the nerve so that the local anesthetic continuously is delivered around the nerve making a consistent nerve block as long as wanted.

Development Phase/Current State

A patent application has been filed. Drawings have been presented to potential manufacturers of whom one is going to be chosen. A pilot study in 20 consecutive patients at Rigshospitalets department for orthopedic surgery for major shoulder surgery will be carried out during summer 2018.

The inventors

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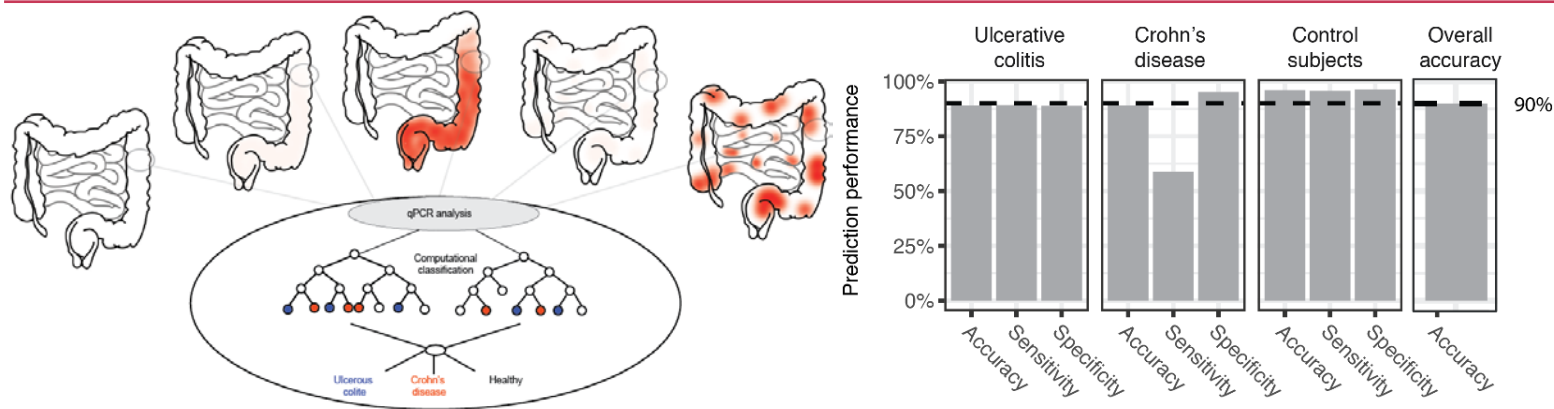
Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Patent application filed 25 March, 2015 - WO2016150448A1

IBDetect™: RNA-based diagnosis of inflammatory bowel disease

A quick and cost-effective route to accurate diagnosis of ulcerative colitis and Crohn's disease



Unique Selling Point

IBDetect™ combines qPCR and machine learning technology to diagnose Inflammatory bowel disease (IBD) patients. It is ideal for the construction of a ready-to-use diagnostic kit.

- It is cheap and easy to implement – qPCR equipment is already widely available at hospitals
- It is quick to use – analysis can be completed within the same time frame as histological examination
- It can increase the quality of IBD treatment without burdening the patient

Objective

IBD is a chronic disorder of the human gut, affecting 1 in 250 Europeans. The main types of IBD, ulcerative colitis (UC) and Crohn's disease (CD), require different pharmaceutical and/or surgical treatments. Diagnosis is based on visual examination of the gut and histological examination of gut biopsies. Diagnosis is difficult: about 15% of patients are not classifiable, and the initial diagnosis is often wrong, which leads to additional costs for the healthcare provider and may harm the patient. Molecular methods to increase the certainty of diagnosis, like IBDetect™, are needed.

Technology Description/Technology Summary

IBDetect™ uses quantitative polymerase chain reaction (qPCR) to determine the relative expression of 35 specific RNA markers in biopsies from the large intestine. The qPCR data is analyzed by a machine learning algorithm which can predict the diagnosis – UC, CD or non-IBD – with an overall accuracy of 90% (Boyd et al, Nature Communications 2018, in press).

Development Phase

IBDetect™ has been tested on a total of 269 subjects (3 cohorts). The overall accuracy was ≥90%.

The inventors

Albin Sandelin, Mette Boyd, Malte Thodberg, Morana Vitezic, Jette Bornholt Lange, Kristoffer Vitting-Seerup, Jacob Bjerrum, Ole Haagen Nielsen

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Seeking

- Partner for clinical testing and development into a commercial diagnostic kit

A priority patent application was filed on 07 July 2017

MedTech and Diagnostics

Knee Laxity in 3D

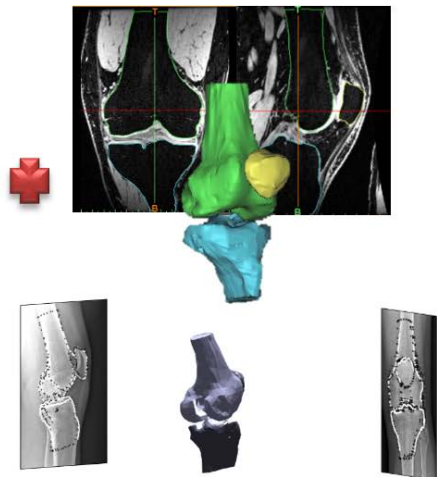
- Accurate non-invasive assessment of knee laxity in 3D



EOS scanner



Mechanical loading device



Bone pose reconstruction

Value Proposition/USP

We present the first ever technology capable of obtaining accurate non-invasive knee laxity in 3D. A technology that will greatly improve diagnostics, preoperative planning and rehabilitation.

Business Opportunity/Objective/Commercial Perspectives

Altered knee laxity occurs frequently after ligament injuries or joint replacements. For knee replacement this is the most common joint replacement, with increasing incidence. In US alone, knee replacements are expected to grow to 3.48 million annual procedures by 2030. However, current methods to assess joint laxity have several limitations, such as one-dimensionality, soft-tissue artifacts and no assessment of the loads applied during testing. These seriously limit their usability in the clinic.

With our technology to accurately measure 3D joint laxity, surgeons, physiotherapists and researchers can objectively quantify 3D joint laxity and use it in the clinical management of the pathologies.

Technology Description/Technology Summary

The technology consists of a mechanical loading device that imposes unconstrained multidirectional loads to the knee through a fixation boot, while placed inside a low-dose biplanar x-ray system (EOS scanner). Knee joint laxity in 3D can then be obtained by combining low-dose biplanar stress x-rays and segmented bone geometry from MRI in a bone pose reconstruction procedure.

Development Phase/Current State

A prototype has been developed and proof-of-concept has been established. The technology has been validated in cadaver studies to investigate the accuracy against invasive methods. Human trials are expected to start in ultimo Q3 2018.

The inventors

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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

IP: "Method and system for measuring the laxity of a joint of a human or an animal" (PCT/DK2018/050003).



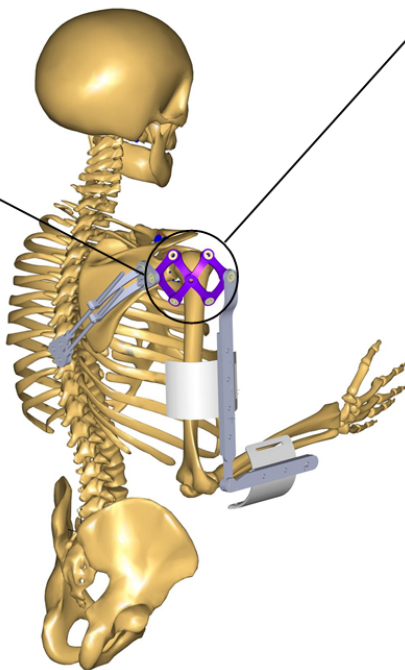
COMPACT X-SCISSORS DEVICE



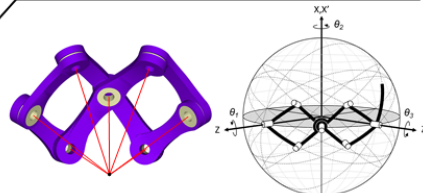
Compact
X-scissors
Device

ACTUATION SYSTEM

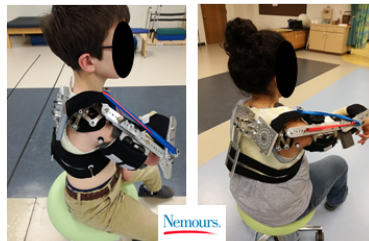
The CXD is a small unit that can make a world of difference... helping improve the lives of people, who just need normal strength, and to be seen as everyone else.



CXD – COMPACT X-SCISSORS DEVICE



- ◆ 3-degree-of-freedom spherical joint (no singularity)
- ◆ All joint axes meet in a common center of rotation
- ◆ Full compatibility with the human shoulder joint
- ◆ High kinematic performance and structural stiffness
- ◆ Most compact component of its kind
- ◆ Currently, the device is body-powered only



ANYBODY
RESEARCH PROJECT

Value Proposition/USP

The commercial potential of the Compact Joint for 3D Spherical Motion is particularly related to the combination of the

- Scalability and Compactness of the joint minimizing the need for space around a center of motion, and the
- High degree-of-freedom to design the joint to fit a specific purpose (including the size of a person, when used in exoskeletons), compared to other known joints, as the curvature and size of individual linkages can be optimized for the required movement, securing
- High degree of control and precision, and enabling full range of motion, with three degrees of freedom.

Business Opportunity/Objective/Commercial Perspectives

Paralysis in the upper extremity can result from traumatic injuries, congenital diseases, stroke, and aging in general. It can make independent life difficult and disable daily activities such as feeding and personal grooming. Exoskeletons can provide assistance and rehabilitation. The majority reject existing well performing devices because they are either bulky, heavy and impractical or do not have a solution for the shoulder complex. A compact solution that can fit and hide underneath clothing may drastically improve the acceptance of these devices and make them actually wearable. Enabling the impaired to achieve normal function and/or enables healthy people to perform heavy lifting, or endure loads for long periods without causing injuries.

Technology Description/Technology Summary

The CXD (short for Compact X-scissors Device) is a spherical scissors mechanism capable of three rotations, thereby mimicking the behaviour of a spherical joint. The mechanism moves on an imaginary sphere with a constant rotation centre and an arbitrary radius determined by the design parameters. Since there is a void space within the mechanism, it is suitable for applications where the mechanical parts surround a given object or workspace. The mechanism is particularly well suited to support anatomical, spherical joints such as the shoulder and the hip, thereby solving a problem that has been haunting the fields of orthotics and exoskeletons for decades.

Development Phase/Current State

Proof-of-concept prototype made of aluminum and steel has been tested successfully as a highly compact shoulder joint in an upper body exoskeleton configuration. Watch the invention here: https://youtu.be/Pw_esFdwGmo

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Seeking

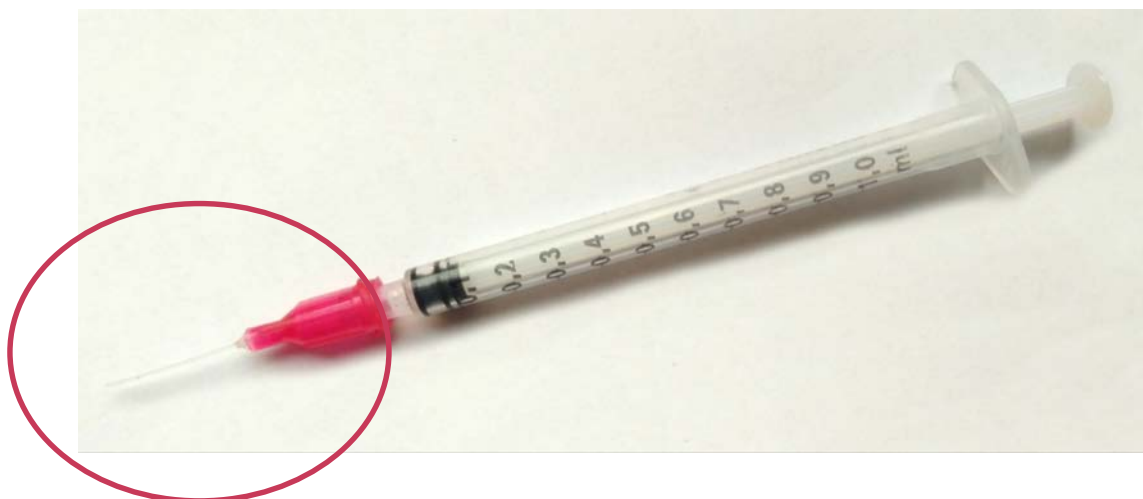
- Funding/Investors
- Licensee
- Partner/Research Collaboration

Patent Pending

MedTech and Diagnostics

Polyneedle

- Less pain, 2 liquids and MR compatibility



Value Proposition/USP

1. Perceived less pain when self injection is required.
2. Polymer needles can inject 2 or more reactive liquids through one needle without mixing the liquids before they are inside the tissue
3. Polymer needles make injections inside MR-scanner possible..

Business Opportunity/Objective/Commercial Perspectives

Fast and more accurate diagnostics of cancer metastases will reduce surgery time and improve treatment.
Simultaneous injection of 2 component drugs for cancer or diabetics treatment.

Technology Description/Technology Summary

Using a unique new patented technology it is possible to produce medical needles in polymer with 2 or more internal chanel. The technology is suited for mass-production and enable truly disposable needles.

Development Phase/Current State

The project is at technology readiness level TRL4 Component validation in laboratory environment. Functional prototypes exist and have been tested on animal tissue. Low volume production equipment is established.

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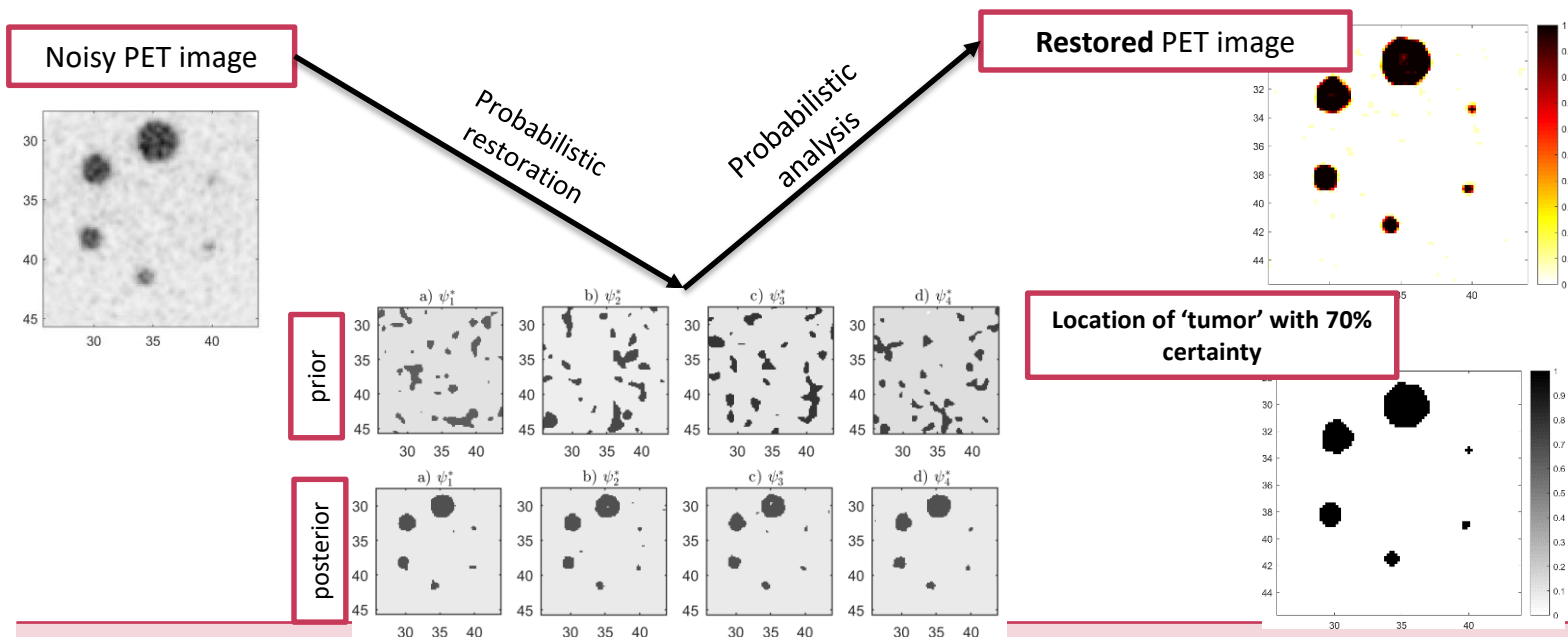
Seeking

- Funding/Investors
- Licensee

DTU ownership: 100%, EP 17169973.9, priority date 8-5-2017

Probabilistic PET restoration

- An early cancer detection method



Value Proposition

It is commonly accepted that an early detection increases the probability of surviving cancer. The technology will enable detecting small and/or emerging cancer cells, better resolved PET images and an enhanced diagnostic workflow. Thus the technology has the potential to increase the survivability of cancer patients

Commercial Perspectives

The technology can be developed to a stand alone product or as an add-on to existing hospital equipment. The product will have:

- Enhanced resolution of PET images
- Increased diagnostic abilities
- Allow doctor expertise to be included in the PET restoration
- Possibility to identify and detect tumors at an earlier stage. Early detection is critical for treatment

Technology Summary

The method is developed from ideas developed to visualize the subsurface in Earth Sciences. Critical is the use of prior information (such that e.g. tissue with cancer corresponds to a sharp boundary in tracer intensity, and hence should reflect a sharp boundary in a PET image). In a addition to a 'noisy' reconstructed PET image, the following information is needed: a) the point spread function of the used scanner, b) a probabilistic model of the noise of the used scanner and reconstruction method, c) a prior model of tracer intensity (provided by medical expertise). The method will provide a number of 'sharp' PET images that all match all information, from which detailed uncertainty and risk analysis can be carried out. One can for example provide a sharpened PET image, or visualize where a tumor exist with more than e.g. 70% certainty.

Current State

The method has been tested as a proof of concept on both scanning data obtained from Rigshospitalet of both known (see above) and unknown objects with cancer. The method is currently being tested to scale to 3D PET restoration after which it is planned to test the method in the clinical environment for a full field test

The inventors

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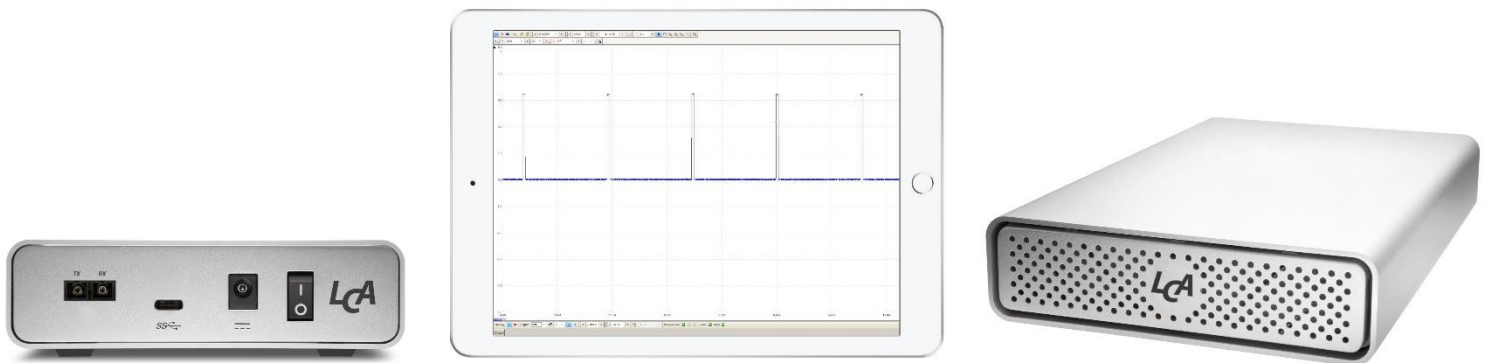
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Seeking

- Funding/Investors
- Licensee
- Partner

Medical+Brain Stimulation

- a MRI compatible neurostimulator from 1.5T to 7.0T



Value Proposition/USP

Electrical stimulation (Deep Brain Stimulation) is **pharmacological therapy going digital**. Neurostimulations delivers an adjustable stimulus to a specific target, thereby reducing systemic side effects as compared to pharmacological therapy. Neurostimulation is used to treat **movement disorders** (Parkinson's Disease, tremor and Tourette's syndrome), **cardiac disease** (use of pacemakers), and is the next big thing in treatment of other **neurological disorders** (Alzheimer and headache) as well as **psychiatric disorders** (depression, addiction and obsessive compulsive disorder).

Business Opportunity/Objective/Commercial Perspectives

The apparatus is **applicable for use in all MRI scanners** (36.000 worldwide) as a combined disposable and non-disposable unit with software license opportunities. The market is huge and fast growing, which lend promise to large revenues. The applications are functional MRI scans of deep brain stimulation, spinal cord stimulation, transcutaneous nerve stimulation, peripheral nerve stimulation, cranial nerve stimulation, electrical muscle stimulation, cortical multi-electrode stimulation, retinal multi-electrode stimulation, gastric electrical stimulation therapy and cardiac stimulation (pacemakers).

Technology Description/Technology Summary

- Optic fiber solution (Tx/Rx)
- No signal interruption between scanner and equipment
- Battery powered floating patient units
- All stimulation data is optical received and logged

Development Phase/Current State

- **Patent** application is submitted
- **Preclinical trials** have been conducted and scientific articles are in writing for international peer reviewed journals.
- Designed for easy and low cost **EMA/FDA and CE approval**.

The inventors

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Carsten Thomsen, MD, Professor

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Seeking

- Funding/Investors
- Partner/ Collaboration
- IPR Sale

Acoustic device for asthma monitoring



Value Proposition

The present technology enables acoustic monitoring of asthma by assessing correct inhaler use, drug administration and lung function with an add-on device for common asthma inhalers. When the inhaler is used the device generates sounds that are recorded by a smart phone allowing the user to assess the inhalation and track their condition. The add-on device and the inhaler are coupled forming a single device and is intended to provide simultaneous drug administration and asthma monitoring.

Business Opportunity

The team behind the invention is working on a product for asthma monitoring and is currently seeking funding for a spin-out company, Sonohaler. The global asthma therapy market is estimated at USD 22 billion and an upcoming smart inhaler market is predicted to grow to USD 1.6 billion by 2022. We see an immense opportunity for improving the lives of the +300 million asthma patients worldwide and reducing healthcare costs associated with hospitalization by better individual control of asthma and a reduction in asthma attacks.

Technology Summary

The device can be used alone or designed to fit a specific inhaler or other devices. The device contains an acoustic element that produces a sound when inhaling or exhaling through the device. The sounds generated can then be used to correlate with the flow rate produced allowing measurements. The sounds can be recorded and processed using software to allow further assessment of inhalation and inhaler use. The technology can be used to monitor inhalation and drug administration giving an indication of lung health and treatment profile.

Development Phase

Prototype devices have been produced and tested in combination with inhalers or as stand alone devices to administer medicine. Correlation between sound and flow rate has been established and software can be used analyze inhalation parameters. It is expected to test the powder flow performance of the product in the near future to demonstrate compatibility with inhaler drug administration. Software and algorithms are under development.

The inventors

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Seeking

- Funding/Investors
- Partner/Research Collaboration

New Startup: Moving from a qualitative to a quantitative description



Denis Selnihhin



Jens Bæk Simonsen



FQuant's unique calibrators will elevate flow cytometry to an exact science

FQuant is a startup company created by two scientists Denis Selnihhin and Jens Bæk Simonsen from Aarhus University and Danish Technical University, respectively.

Value Proposition:

Our calibrator technology provides highly improved solutions to two major problems in flow cytometry:

- **Quantification:** Current calibrator products can only determine very high numbers of surface protein (typically >2000 proteins) on cells and biological vesicles. However, a large proportion of e.g. protein-based biomarkers is expressed at much lower levels on these biological particles. The increased interest in finding protein biomarkers for understanding biology and various diseases needs proper technologies to detect and quantify these low abundant proteins across e.g. various flow cytometry facilities.
- **Standardization:** In order to compare flow cytometry data from different laboratories and across different flow cytometers proper standardization tools are highly needed. The lack of precise, accurate and uniform standardizations is an obstacle for development of new flow cytometry based assays. A more uniform and accurate measurement in flow cytometry will allow new development for both basal and applied research. This will enable a giant leap forward for development of flow cytometry based assays.
- Global calibration bead market is estimated to reach **\$213 M by year 2020**

Business Opportunity/Objective/Commercial Perspectives

Health care, diagnostics, flow cytometry, research

Technology Description

We have developed novel calibrator technology for flow cytometry (FC) that relies on the fluorescence intensity of individual precisely fluorophore-labeled particles. Labelling precision and low range (1-2000 fluorophores) allows quantification of flow cytometry output signal on a completely new level. FQuant allows precise quantification of low abundant antigens presented on cells, viruses, exosomes and microvesicles.

Development Phase

We have successfully formed uniform medium sized particles and labeled these with 80 and 160 fluorophores. Thus, we have already proved that we can form stable and well-defined particles that can be used as calibrators. We plan to increase the size of the particles to increase the degree of fluorophore-labeling and thereby form calibrators that cover a large dynamic range (50-2000 fluorophores) needed for proper commercial use. Patent application was filed with intend to create a company producing calibration bead kits.

The inventors

Denis Selnihhin, post.doc.
Jens Bæk Simonsen, associate professor

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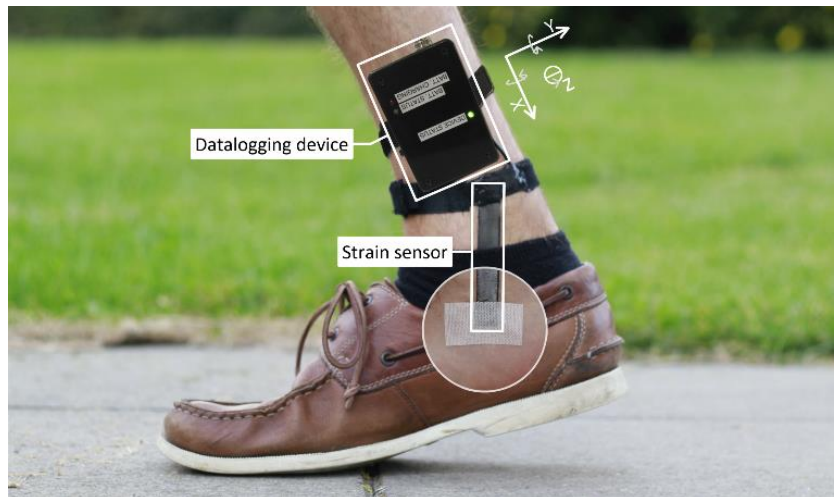
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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

A European patent application has been filed (EP18154868)

Device for measuring body part movements and stretch



Value Proposition/USP

Musculoskeletal disorders cost society approximately 36 billion annually and is a major cause of early retirement. The device is a new clinical diagnostics- and monitoring-equipment, that enables measuring the effect of therapy (e.g custom orthotics), minimizing human factor and ensuring an accurate diagnosis of fault position. A low cost solution with potential in the clinical-, sports-, and customer-specific shoes realm.

Business Opportunity/Objective/Commercial Perspectives

As a diagnostic tool the device can assist the clinician in assessing the accurate position of the foot for diagnostic purposes. Shoe specialists can ensure that a customer receives the best insole for the purpose, both in professional and commercial use. In sports the device can be used to optimize movement patterns during training and help with footwear selection

Technology Description/Technology Summary

The device consists of a controller box connected to a stretch sensors, collecting data on body part movements. The controller has integrated gyroscope and accelerometer and stores sensor profiles and enable logging of data on SD card and direct transfer to PC. The sensor is build on 3 silicon-coded layers, making it resistant to perspirations. The device enables quantifying body part movement and stretch, resistance of the sensor indicate a complete linear function of the change in length of the sensor and thereby movement of the foot. The system has software to calibrate and visualize the movement of the foot.

Development Phase/Current State

We have extensive clinical validation of a prototype and need to develop a commercial and clinical friendly product adapted to several applications. We are looking for investors as well as a commercial partner to set up a company to exploit the technology potential.

The inventors

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Henrik Karstof
Peter Ahrendt
Simon Lind Kappel and Dan Hermann

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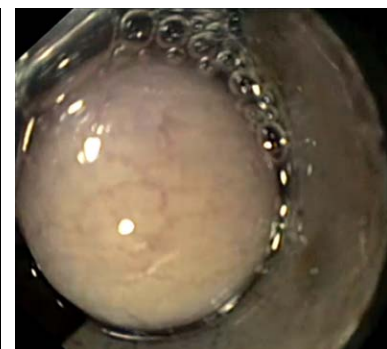
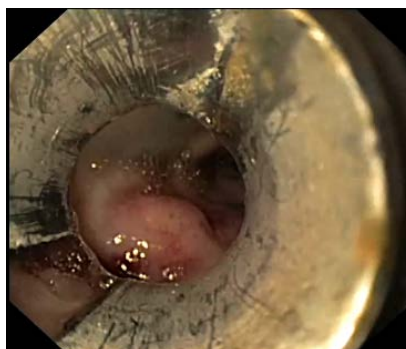
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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Therapeutic Endoscopy

- using minimally-invasive electroporation technology



Value Proposition

Minimally-invasive technology for endoscopic treatment exploiting electroporation of the tissue of interest.

- Tissue treatment through direct, localized cellular permeabilization of the tissue of interest.
- Tissue destruction through controlled cell-death induced by electroporation.
- NO heat damage and NO perforation risk.
- Compatible with clinically used endoscopic devices/instruments

Today, electroporation is used in the clinic to facilitate localized chemotherapy in tumors (Cliniporator) or to safely destroy tumor cells by controlled cell-death (Nanoknife). With this minimally-invasive technology, electroporation is possible with endoscopy.

Business Opportunity

Improved treatment of the intestinal system, urinary bladder or lungs with minimally-invasive removal or treatment of tissue through electroporation using the add-on technology with existing endoscopes. The technology aid in the continuing cancer screenings process and may reduce the number of rehospitalisations but will also improve the drug delivery by direct treatment.

Technology Summary

We have invented an add-on cap and a system for endoscopic electroporation: Electroporation is a molecular biology technique in which an electrical field is applied to cells in order to increase the permeability of the cell membranes. The increased permeability can facilitate drug entrance into the cells, and after restitution the cell membranes restore its integrity. The increased permeability can also induce apoptosis (controlled cell-death) where affected cells will die quietly.

Development Phase

Different prototypes have been developed and proof-of-concept has been established using porcine cancer models. The current prototype is believed to include the features required for a commercial product.

The inventors

Torben Geert, Clinical Medico Technician
Iben Lyskjær, MSc.
Morten Callesen, MSc. & PhD
Vibeke Uhre, Laboratory Technician
Mads Heilskov Rasmussen, MSc. & PhD
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Seeking

- Licensee
- IPR Sale

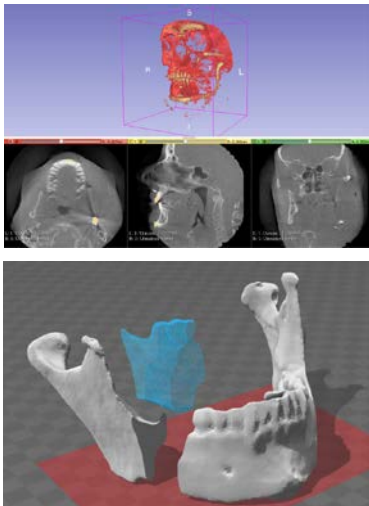
Intellectual property rights: PCT application number PCT/EP2017/064280 made publicly available on 21 December 2017 under publication number WO 2017/216102



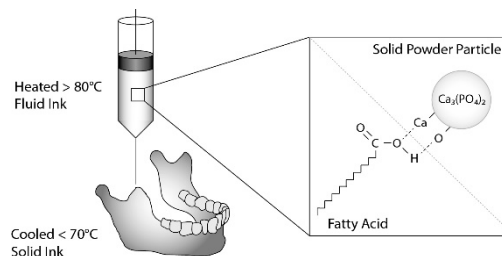
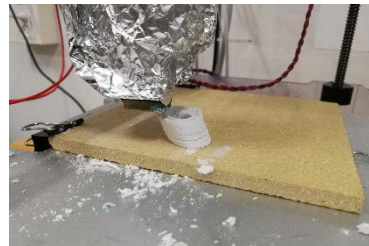
3D PRINTED ENDEGENOUS BONE IMPLANTS

- 1. GENERATION IMPLANTS FROM PARTICLE3D

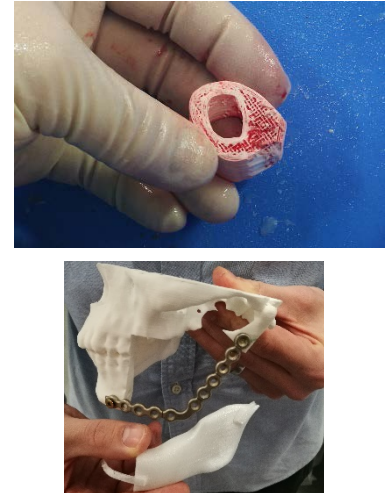
Patient fitted



3D Printed



Complete Restoration



USP

- | | |
|-----------------------------|---|
| Endogenous material | → No need for bone grafting from patients. Minimizes complications for each patient and shortens hospital admission. |
| Building block of bone | → Develops into living bone tissue over time. |
| Patient specific and fitted | → Customized through 3D printing to fit each individual patient. Shortens surgery time and improves aesthetic outcome |
| Drug loadable pipeline | → The developed technology allows unique storage of therapeutic drugs. No other comparable product on market. |

Commercial Perspectives

The use of patient customized implants is growing fast yet current solutions are based on foreign permanent materials with high complication & re-surgery rates. We are uniquely able to provide patient customized implants that are both fully composed of resorbable and endogenous materials. This makes us well suited to enter a market of over 2.000.000 procedures worth \$2.000.000.000 in revenue and growing 5% annually.

Technology Description

Particle3D's developed technology is a platform technology based on a novel patented powder/lubricant ink that can be 3D printed, molded or extruded into implants or be injected directly. Patient fitted implants may be 3D printed by heating the ink to melt in a syringe and then depositing it layer-on-layer according to a CAD file derived from patient CT-scanned data. On the colder build platform the ink solidifies into the designed implant. The implant is then fired to remove the lubricant, leaving pure sintered powder, that can be inserted in to a patient to restore bone damage.

Current State

Particle3D has successfully carried out a large animal trial involving pigs, where large resections of jaw was removed and replaced with pig-specific designed implants. No severe adverse events were seen.

Particle3D IVS is currently in the process of closing our first seed investment. It will be used to expand the patent to required territories as well as setting up the organization for conduction of an clinical trial. We are currently seeking collaborators and partners for this task.

The inventors

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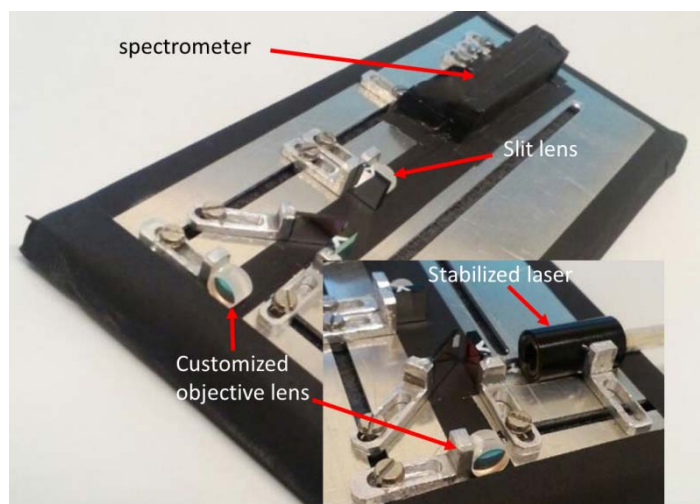
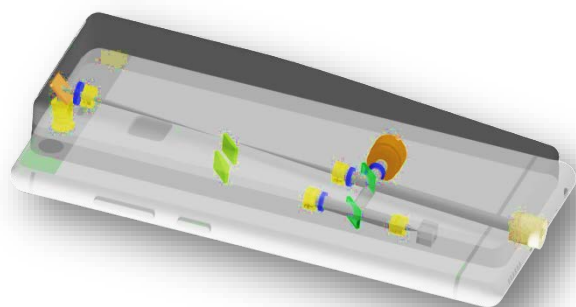
Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration

IP rights are held by the University of Southern Denmark, National phase – multiple territories.

PhotoRaman

- Smartphone based molecular analyzer



Value Proposition/USP

The PhotoRaman optics are specially optimized for smartphone sensor, turning an everyday smartphone into a powerful Raman spectrograph. The device demonstrates sensitivity comparable with professional portable Raman analyzers. However, the sale price of PhotoRaman is expected to be 10 times cheaper (~ 8000dkk) in comparison with commercially available portable Raman devices.

Business Opportunity/Objective/Commercial Perspectives

The portable Raman device market is estimated to \$107M and is growing at about CAGR 9%. Due to relatively low price of PhotoRaman we would like to implement it as a default sensor in smartphones via collaboration with mobile companies, which would highly expand the potential market. We believe that PhotoRaman will be of interest for the consumer market as a gadget to identify chemical composition of materials in everyday life: drugs, plastics, liquids, etc. On the other hand, the technology can compete with professional portable Raman devices. Therefore PhotoRaman can be used by in the pharmaceutical industry and by customs and police for drugs and narcotics identification in the already established market.

Technology Description/Technology Summary

PhotoRaman is a module attached to the smartphone photocamera sensor. It is equipped with a laser that shines the sample placed on the bottom of the smartphone. Scattered signal are collected by the smartphones imaging sensor, and after processing, information about the chemical composition of the sample will be readily available. With PhotoRaman you can identify molecular composition of drugs, plastics, liquids, etc.

Development Phase/Current State

The first prototype of PhotoRaman is assembled and ready for operation in conjunction with smartphone. Device requires the development of robust optomechanics and software for data acquisition and data analysis.

The inventors

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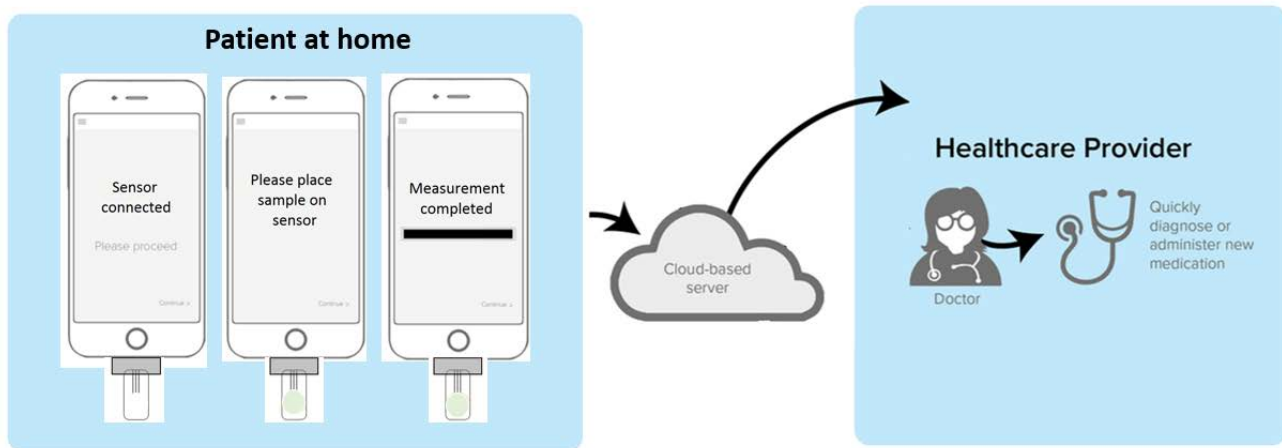
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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaborator
- IPR Sale

PreDiagnose

- The next generation of bacterial detection



Value Proposition/USP

Our technology is capable of instant microbial identification that is faster (60 sec vs several days), cheaper (up to 79% of savings per year) and more reliable than existing methods. The technology allows more frequent monitoring and/or a quicker diagnosis of early and intermittent infections by everyone, everywhere.

Business Opportunity/Objective/Commercial Perspectives

Patients infected with microorganisms are limited to late and poor diagnosis techniques. As a consequence, they are left to deal with a difficult treatment, poorer life quality and shorter life expectancy. We propose a time- and cost-effective fast point-of-care device able to detect early infections in a non-invasive manner.

Technology Description/Technology Summary

A point-of-care device with disposable sensing-array that can detect bacterial infections in patient samples immediately after infection. An electric signal is sent to the sample and a measured signal is analyzed using an algorithm to identify the presence of specific microbial organisms. The sensor can be hooked to a smart phone and the results send to the health care provider.

Development Phase/Current State

The patent behind our technology is in the PCT phase (PCT/EP2017/058614)

We are currently expanding the library of microbials we are capable of detecting with the technology.

The inventors

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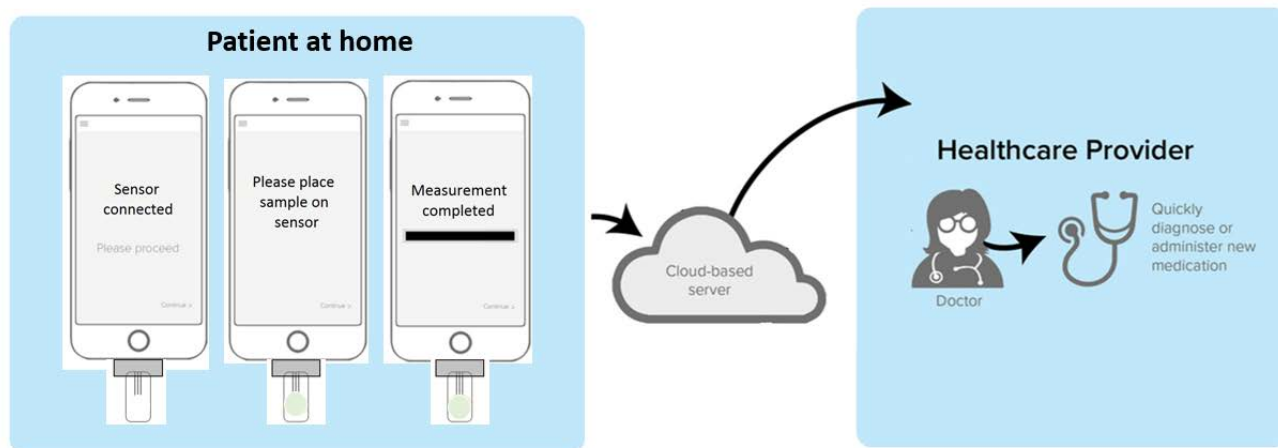
Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Intellectual property rights: PCT/EP2017/058614 /WO 2017/178455/19 October 2017

PreDiagnose

- The next generation of bacterial detection



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The inventors

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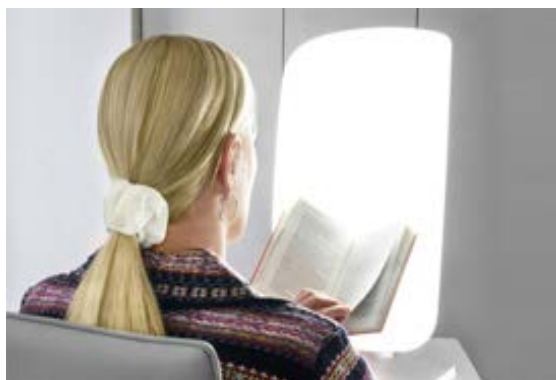
Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Intellectual property rights: PCT/EP2017/058614 /WO 2017/178455/19 October 2017

A Non-Invasive Light Therapy System for Potentially Slowing Down the Progression of Alzheimer's Disease

Alzheimer's disease (AD) is the most common cause of dementia and accounts for more than 50% of all dementia cases. Novel research has just opened new opportunities to attack AD through non-invasive therapy, essentially synchronizing brain frequency, inducing gamma oscillations with a specific frequency stimuli and thus activating certain brain regions in a protective manner.



Value Proposition/USP

State-of-the-art light therapy and Alzheimer's diagnostics to improve life quality of the individual Alzheimer's patients and their families as well as decreasing the burden of Alzheimer's disease on daily caregivers and the society.

Business Opportunity/Objective/Commercial Perspectives

Alzheimer's Disease is an increasing cost to any society worldwide. In US alone; today 5.3 million Americans are diagnosed with Alzheimer's Disease. Medicare spends \$90 billion USD extra annually on patients with Alzheimer's compared to the norm, and Medicaid spends \$42 billion USD extra. We have around ~50 millions people diagnosed with Alzheimer's Disease worldwide, that adds up to a direct cost of around half a trillion dollars, annually.

Technology Description/Technology Summary

We are advancing a medical breakthrough done on mice, published originally by MIT. In this project, we have found a risk-free patient centric approach to apply light therapy to potentially treat the patients at risk of developing dementias. Our invention is a new innovative light source and we intend to document the applicability of this device in preventing neuronal damage and preserve cognitive function in clinical proof of concept with subsequent scaling of clinical trials into Alzheimer patients.

Development Phase/Current State

We are currently working on the product development and medical validation, as well as important milestones, such as medical approvals and first sales. Heavy investment in research for medical validation will be done, sustained by funding, with the prospect of promising revenues. One the prototype side; even though further development is needed, highly-reliable prototypes have been built and a minimum viable product has been reached.

The inventors

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Seeking

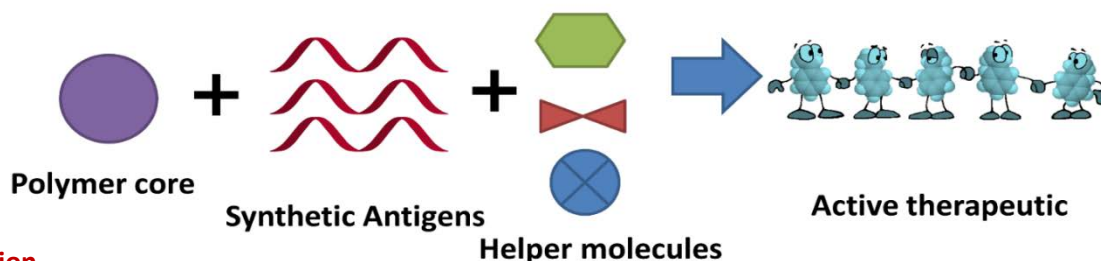
- Funding/Investors
- Partner/Research Collaboration
- Talent

Intellectual property rights: To be determined



Specific therapeutics and diagnostic tools for autoimmune diseases

We develop reliable tools for accurate detection and point of care treatment of human autoimmune diseases

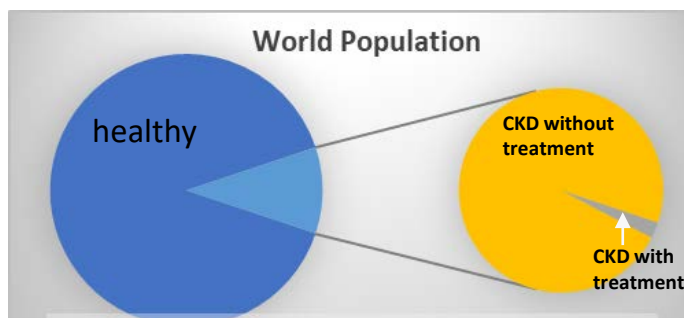


Value Proposition

Up to 10% of the population has autoimmune diseases. Scandinavia has one of the highest rates for autoimmune diseases in the world. Rheumatoid arthritis, type 1 diabetes and lupus are very common (2% males and 8% females are at risk). **Market is estimated at 100+ billion USD, and is still growing.**

Many symptomatic drugs and diagnostic tests are being developed. Available therapeutics have serious side effects, and none of them interfere with the cause of the disease, i.e. autoreactive cells, antibodies and inflammatory cytokines. Diagnostics is extremely challenging as well, due to complicated disease biomarkers and lack of specificity for current tests.

We develop novel conjugates that take advantage of **specific targeting of the disease related molecules and cells**. This results in safe, reliable therapeutic options, and accurate tests for e.g. Lupus, rheumatoid arthritis and type 1 diabetes.



Business Opportunity

- **Potential areas of use:** medical care, autoimmune disease diagnostics, monitoring and treatment.
- **Customers:** hospitals and distribution to patients via pharmacies; patients suffering from autoimmune diseases.
- **Cost of production:** 35% of the cost for currently used NSAIDs/DMARDs, and only 15% of the cost for other biologics (monoclonal antibodies)

Technology Description

We design disease specific antigens and conjugate them, along with helper molecules, to organic polymer cores. Resulting nanoconjugates are stable, easy to produce, scalable and bioactive according to our in vitro and in vivo studies.

Development Phase

- Current stage: two generations of therapeutics successfully synthesized and tested in cells, in human blood and in 60 mice. Patent application filed (P2395EP00). New tests planned in the near future.
- Diagnostic tests are developed and benchmarked vs existing techniques (ELiA, commercial ELISA tests).

The Inventor:

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Seeking:

Collaboration
Network
Investors

- **Intellectual Property Rights:** -Novel artificial phospholipid-protein bioconjugates for biomolecular recognition, PCT/DK2015 /050346 (2015) ; New Therapeutics for Autoimmune Kidney Disease: Synthetic antigens P2395EP00, submitted January 2018.